UNIVERSITY OF BIRMINGHAM

Predicting Time Series Data using Machine Learning ...

Wai Lee Boo 2625170
Supervised by: Professor Leandro Minku

1 Aim

The aim of this project is to develop a machine learning-based system capable of predicting market trends by analysing both historical financial time-series data and relevant news data. The project seeks to investigate how combining quantitative market data with qualitative textual information can enhance the accuracy and reliability of stock market predictions.

2 Background

Time-series prediction is a fundamental challenge in data science with wide application areas such as weather forecasting, energy demand prediction, and financial market analysis. In the stock market, accurate forecasting is particularly valuable yet almost impossible due to the high volatility and non linear nature of financial data. In recent years, researchers have adopted advanced machine learning techniques, including deep learning architectures such as Long Short-Term Memory (LSTM) and Transformer networks. Moreover, models have also begun incorporating external textual data, such as financial news and social media sentiment to improve prediction accuracy. However, while such data can provide valuable contextual signals about market events, it may also introduce noise due to biased, exaggerated, or misleading information. Therefore, developing and incorporating mechanisms within machine learning models that can effectively identify and filter unreliable or exaggerated news content is a key challenges in improving the accuracy and robustness of financial time-series forecasting.

3 Motivation

Discus as much as market needs and academic needs for your project. It is expected that in this section you will get about 10 15 general technical CS challenges. Use surveys for showing the market need of your project. Why this system is to be developed. Your goals behind working and achieving your project

4 Problem Definitions

-having a complex data like training to read trends or overhype news might overfit the

5 Project Description

Show down with a figure the proposed system .

5.1 Scope

The scope of your project.

5.2 Task Breakdown

1. **Step 1: Research and Data Preparation**

   - Conduct literature review on stock market prediction models
   - Collect historical financial data from reliable sources
   - Collect historical news data from social media

6 Similar System Information

Dynamic Swarm Intelligence for Time Series Concept Drift Motivation of this work (Why the researchers do it) The main problem statement of the work. How the researchers contributed to solve the problem What main results the researchers reach. How do you think this paper you read is important for you.

6.1 Similar System Description

6.2 Comparison with Proposed Project

6.3 Screen Shots from previous systems (if needed)

7 References

References